

**The L101L-IS-C beacon is CE marked to show compliance with the European Explosive Atmospheres Directive 94/9/EC and the European EMC Directive 89/336/EEC**

## 1. INTRODUCTION

The L101L-IS-C is an ATEX certified intrinsically safe beacon which will produce a visual warning in a hazardous area. Red, amber and green output models are available.

The beacon has been designed and certified to work alone or in conjunction with a European Safety Systems A105N-IS intrinsically safe sounder. The beacon may be powered from the same intrinsically safe circuit as a A105N-IS intrinsically safe sounder, allowing a combined audible and visual alarm to be constructed. The L101L-IS-C beacon also contains an alarm accept facility which allows an operator to silence the sounder for a predetermined time while leaving the beacon flashing at twice its normal rate.

The L101L-IS-C not only performs all the functions of a traditional intrinsically safe xenon beacon, but it has a coloured output and the ability to power a sounder. It also incorporates an alarm accept facility.

## 2. DESCRIPTION

Fig 1 shows a simplified block diagram of a L101L-IS-C beacon. The device will start to flash when power is applied to terminals 1 and 2. Terminals 3 & 4 are for the connection of an optional A105N-IS sounder which will operate immediately power is applied to the beacon. The sounder may be silenced for a predetermined time by momentarily connecting terminals 5 & 6 together. The silence time may be adjusted between 1 and 30 minutes by a potentiometer inside the beacon.

When used alone, i.e. without a sounder connected, two flash frequencies may be selected. With terminals 5 and 6 disconnected the beacon will produce two flashes in quick succession once per second. The flash frequency can be doubled by permanently connecting terminals 5 and 6 together.

When used with a sounder, the beacon produces two flashes in quick succession once per second. When the sounder is silenced the flash frequency is automatically doubled.

## 3. SUPPLY VOLTAGE

The L101L-IS-C beacon has been designed to operate in a hazardous area via a Zener barrier or galvanic isolator. The recommended supply voltage ranges are shown in sections 6 and 7. The beacon may be tested or used in safe areas without a Zener barrier or galvanic isolator, but at supply voltages above 16V the internal current limit will function and the brightness may be reduced. The beacon should not be continuously operated without a barrier or isolator with a supply voltage greater than 16V.

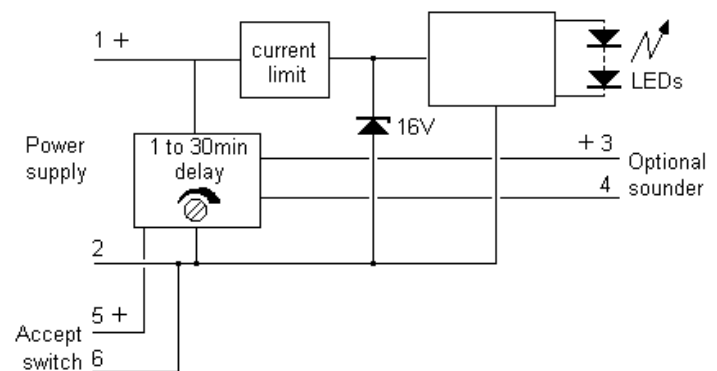


Fig 1 Simplified block diagram

## 4. INTRINSIC SAFETY CERTIFICATION

### 4.1 ATEX certificate

The L101L-IS-C beacon has been issued with EC-Type Examination Certificate number ITS02ATEX2006 by Notified Body Intertek Testing Services (ITS) confirming compliance with the European ATEX Directive 94/9/EC for Group II, Category 1, gas atmospheres, EEx ia IIC T4. The instrument bears the Community Mark and, subject to local codes of practice, may be installed in any of the European Economic Area (EEA) member countries. i.e. Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Norway, The Netherlands, Portugal, Spain, Sweden and the United Kingdom. ATEX certificates are also accepted in Iceland, Liechtenstein, Switzerland and the Czech Republic.

This instruction sheet describes installations which conform with BS EN60079:Part14:1997 Electrical Installation in Hazardous Areas. When designing systems for installation outside the UK, the local Code of Practice should be consulted.

#### 4.2 Zones, Gas Groups and T rating

The L101L-IS-C LED beacon has been certified EEx ia IIC T4. When connected to an approved system it may be installed in:

- Zone 0 explosive gas air mixture continuously present.
- Zone 1 explosive gas air mixture likely to occur in normal operation.
- Zone 2 explosive gas air mixture not likely to occur, and if it does, it will only exist for a short time.

Be used with gases in groups:

- Group A propane
- Group B ethylene
- Group C hydrogen

Having a temperature classification of:

- T1 450°C
- T2 300°C
- T3 200°C
- T4 135°C

Although certified intrinsically safe at ambient temperatures between -40 and +60°C the guaranteed operating temperature range of the beacon is -20 to +60°C.

#### 4.3 Certification label information

The certification label is fitted to the side of the beacon. It shows the model number, ATEX certification information and European Safety Systems Ltd. address. The year of manufacture and the beacon serial number are shown on a separate label within the enclosure.



#### 4.4 Terminals 1 & 2 - power supply

Power is supplied to the beacon via terminals 1 & 2 which have maximum input safety parameters of:

- U<sub>i</sub> = 28V
- I<sub>i</sub> = 110mA dc
- P<sub>i</sub> = 0.8W

L101L-IS-C beacons may be powered from any Zener barrier or galvanic isolator certified by an EC Approved Body with output parameters within these limits, e.g. a 28V, 93mA, 0.65W Zener barrier.

Up to three L101L-IS-C beacons can be connected in parallel and be powered from a common barrier or isolator. Parallel connection of beacons will significantly reduce the brightness

of each device. Sounders must not be powered from beacons connected in parallel.

The equivalent capacitance and inductance between terminals 1 & 2 of the L101L-IS-C beacon and between terminals 1 & 4 of the A105N-IS sounder are zero.

The maximum permitted cable parameters defined by the barrier or isolator certificate must not be exceeded.

#### 4.5 Terminals 3 & 4 - connection for optional sounder

These terminals have the same maximum output safety parameters as the Zener barrier or isolator powering the beacon, i.e. they are equal to or less than:

- U<sub>o</sub> = 28V dc
- I<sub>o</sub> = 110mA dc
- P<sub>o</sub> = 0.8W

This allows direct connection of a A105N-IS-IIB or A105N-IS-IIC sounder, which are covered by BASEEFA certificates BAS00ATEX1180 and BAS01ATEX1181 respectively. The A105N-IS-IIB sounder may only be used when the hazardous gas is in Group A or Group B.

If the beacon and sounder are mounted apart, for intrinsic safety assessment the capacitance and inductance of the interconnecting cable should be added to that of the cable connecting the barrier or isolator to the beacon. See section 4.4.

#### 4.6 Terminals 5 & 6 - accept switch

The output safety parameters of these terminals are:

- U<sub>o</sub> = 16.8V
- I<sub>o</sub> = 1.6mA
- P<sub>o</sub> = 7mW

They may be connected to any mechanically operated switch in the same hazardous area as the beacon providing the switch has IP20 protection and can withstand a 500V rms insulation test to earth for 1 minute.

The maximum permitted parameters for the accept switches cable are as follows:-

Group	Capacitance (µF)	Inductance (mH) or L/R Ratio (µH/ohm)
IIC	0.39	1000 379
IIB	2.29	1000 379
IIA	9.30	1000 379

#### 5. INSTALLATION

In addition to the certification requirements shown in section 4.2 the environmental conditions must be within the limits shown on the product specification. The beacon enclosure provides IP56 protection and is suitable for installation in a sheltered exterior location if an appropriate sealed cable entry is used. Please contact European Safety Systems Ltd. if high vibration is anticipated.

##### 5.1 Mounting

The L101L-IS-C beacon may be secured to any flat surface using the two 6mm diameter fixing holes. The lens should be aimed towards the area where maximum visibility is required.

##### 5.2 Installation procedure

- a. Remove the beacon lens by unscrewing the two captive 'A' screws and pull the lens away from the back box.

- b. Fit an IP56 M20 cable gland or conduit entry into one of the holes in the enclosure. Secure the back box to a vertical surface using the 6mm diameter holes in the two fixing lugs.

Alternatively, the L101L-IS-C beacon may be mounted directly onto a A105N-IS sounder enclosure and secured using a joining kit which is available from European Safety Systems Ltd.

- c. Finally connect the field wiring to the removable terminals, replace the lens and tighten the two 'A' screws.

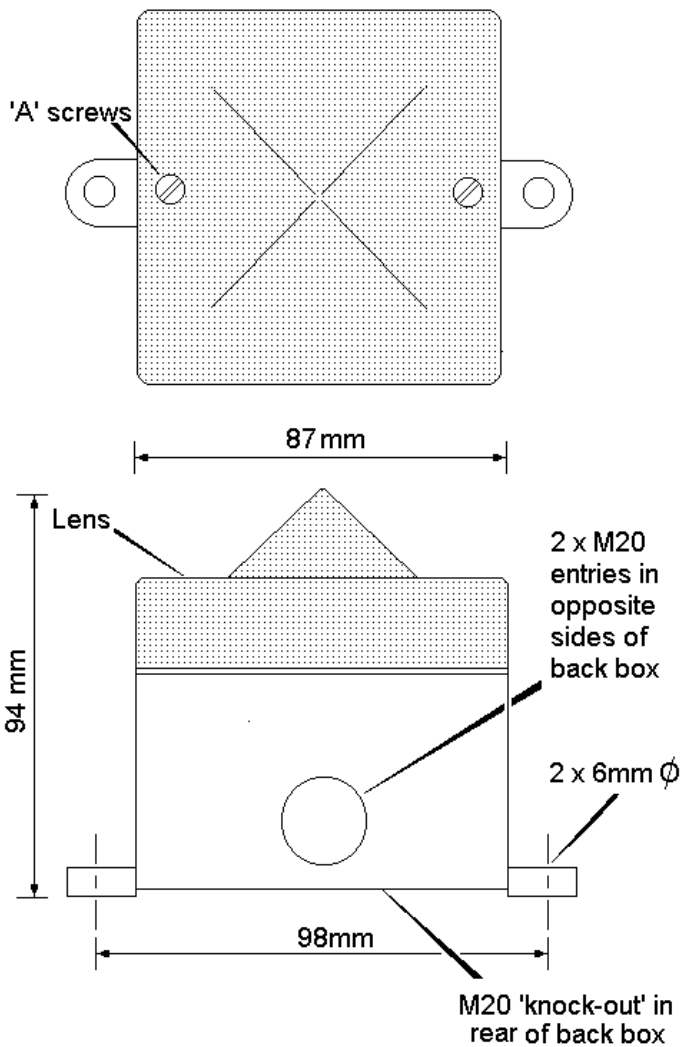
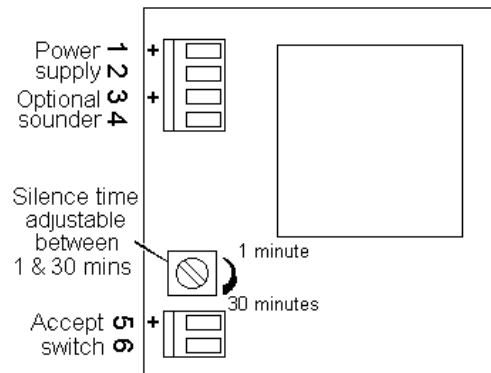


Fig 2 L101L-IS-C



When the beacon is used alone i.e. without a sounder, terminals 5 & 6 should be connected together

Fig 3 Location of field terminals and controls.

## 6. ELECTRICAL SYSTEM DESIGN FOR INSTALLATION IN HAZARDOUS AREAS USING ZENER BARRIERS

### 6.1 Stand alone operation

If the beacon is controlled by a switch in the positive supply, or the power supply is being turned on and off, only a single channel Zener barrier is required as shown in Fig 4. This circuit may also be used if the beacon is being controlled by a mechanically activated switch on the hazardous area side of the barrier. The power supply voltage should be between 20V and the maximum working voltage of the barrier. The circuit will continue to work at lower voltages, but the beacon brilliance will be reduced.

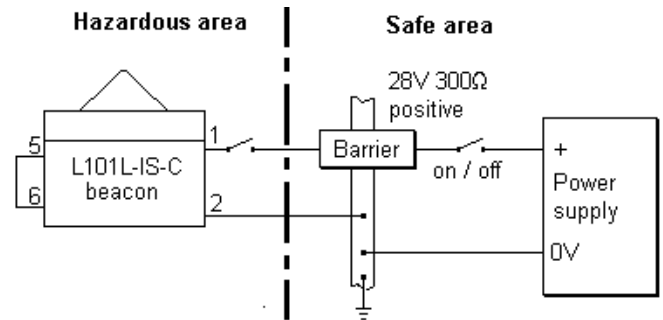


Fig 4 Using a single channel barrier.

If the beacon control switch is in the negative wire and the power supply 0V is earthed, the circuit shown in Fig 5 may be used. For simplicity the two barriers may be combined into one package. The power supply voltage should be between 21V and the maximum working voltage of the 28V barrier. The circuit will continue to work at lower voltages, but the beacon brilliance will be reduced.

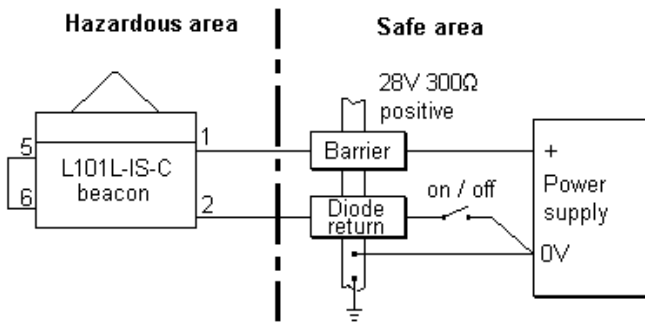


Fig 5 Single stage alarm using two channel barrier.

### 6.2 Use with a A105N-IS intrinsically safe sounder

The very low current consumption of the L101L-IS-C beacon allows it and a A105N-IS-IIC or A105N-IS-IIB intrinsically safe sounder to be powered from a common Zener barrier as shown in Fig 6. This reduces the sounder output by about 2dBA.

The L101L-IS-C beacon contains an adjustable timer activated by a pair of external contacts which will silence the sounder for up to 30 minutes, but leave the beacon flashing at twice its normal frequency. The sounder silence time is set by a potentiometer inside the beacon as shown in Fig 3. An operator may therefore silence the audible alarm but be continuously reminded of the alarm condition by the beacon. If the alarm is not cleared within the silence time, the sounder will be reactivated. If the alarm is cleared during the silence time the beacon will stop flashing, but the beacon and the sounder will both be re-activated if the alarm reoccurs.

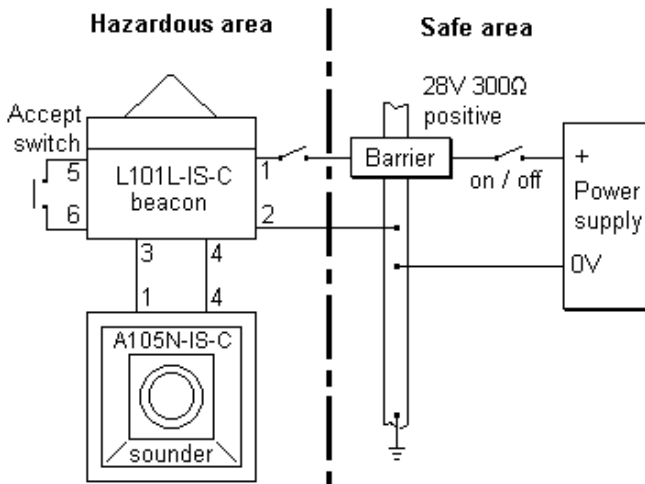


Fig 6 Combined beacon and sounder with alarm accept switch

The accept push-button may be any mechanically operated IP20 switch located within the same hazardous area as the beacon, see section 4.6.

The power supply voltage must be between 21V and the maximum working voltage of the 28V barrier. A higher

voltage will result in more output from the sounder and the beacon.

## 7. ELECTRICAL SYSTEM DESIGN FOR INSTALLATION IN HAZARDOUS AREAS USING GALVANIC ISOLATORS.

Although more expensive than Zener barriers, galvanic isolators are easier to install as they do not require a high integrity earth connection. Any certified device with output safety parameters below the maximum input safety parameters of the L101L-IS-C beacon may be used – See section 4.4.

### 7.1 Stand alone operation

Fig 7 shows the basic circuit that is used for all stand alone applications.

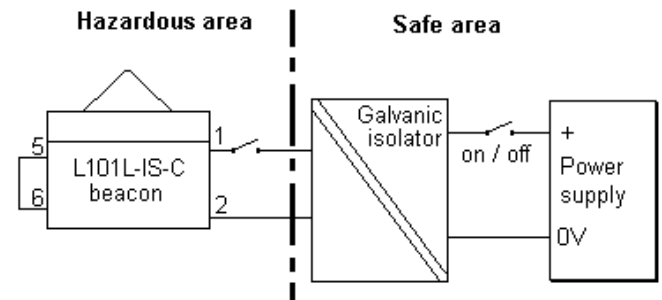


Fig 7 Basic circuit for use with a galvanic isolator.

The control arrangement will vary depending upon the isolator chosen. The galvanic isolator must be able to supply an output of 25mA at about 16V. This circuit may also be used if the beacon is controlled by a mechanically activated switch on the hazardous area side of the isolator.

### 7.2 Use with a A105N-IS intrinsically safe sounder

The very low current consumption of the L101L-IS-C beacon allows it and a A105N-IS-IIC or B385-IIB intrinsically safe sounder to be powered from a common galvanic isolator as shown in Fig 8. This reduces the sounder output by about 2dBA.

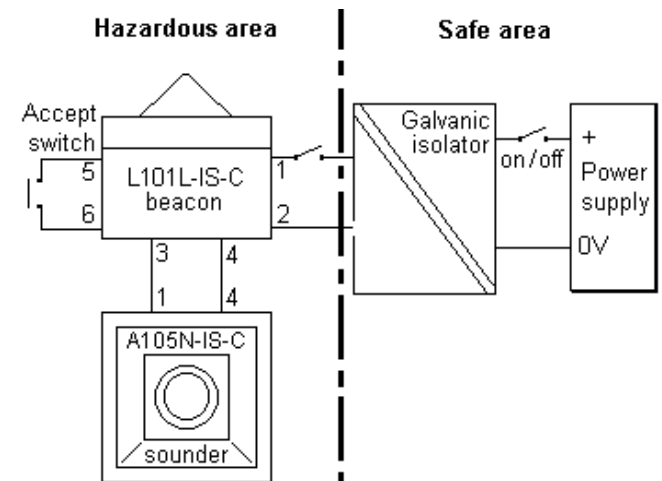


Fig 8 Combined beacon and sounder with alarm accept switch

The L101L-IS-C beacon contains an adjustable timer activated by a pair of external contacts which will silence the sounder for up to 30 minutes, but leave the beacon flashing at twice its normal frequency. The sounder silence time is set by a potentiometer inside the beacon as shown in Fig 3. An operator may therefore silence the audible alarm but be continuously reminded of the alarm condition by the beacon. If the alarm is not cleared within the silence time, the sounder will be reactivated. If the alarm is cleared during the silence time the beacon will stop flashing, but the beacon and the sounder will both be re-activated if the alarm reoccurs.

The accept push-button may be any mechanically operated IP20 switch within the hazardous area, see section 4.6. The chosen galvanic isolator must be able to supply an output of 40mA at about 11V.

## 9. ACCESSORIES

### 9.1 Tag number

The L101L-IS-C beacon can be supplied identified by a tag number thermally printed on a self adhesive label.

### 9.2 Beacon to sounder joining kit

Comprises an M20 plastic conduit coupler and gasket enabling the beacon to be mounted onto a A105N-IS sounder. This kit is supplied free of charge when a beacon and sounder are purchased at the same time.

## 10. MAINTENANCE

The beacon should be regularly inspected to ensure that it has not been damaged. Frequency of inspection depends upon environmental conditions, but initially we recommend that this should be done annually.

**No attempt should be made to repair a faulty L101L-IS-C beacon. Suspect beacons must be returned to European Safety Systems Ltd. or to your local agent for repair.**

## 11. GUARANTEE

Beacons which fail within the guarantee period should be returned to European Safety Systems Ltd. or our local agent. It is helpful if a brief description of the fault symptoms is provided.

## 12. CUSTOMER COMMENTS

European Safety Systems Ltd. are always pleased to receive comments from customers about our products and services. All communications are acknowledged and whenever possible, suggestions are implemented.